Information on Type and Size of Retainer:

Size: 10 inch

Type: Baker Tools

See attached inspection report

BRAUN INTERTEC

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Engineers and Scientists Serving the Built and Natural Environments

Daily Report

Date: November 6, 1997

Project: BHEX-97-004

Client:
Mr. Keith Jensen
Robert Peccia & Associates
P. O. Box 4644
Helena, Montana 59604

Project Description:
Construction Oversight
Artesian Well, Bluewater Springs
Trout Hatchery Improvements
Bridger, Montana

Arrived at site at 8:00 a.m. to observe the installation of the downhole retainer to abandon the well. Met Pat Sapp with Baker Tools, who was the certified technician involved in selecting the location (depth) and installing the retainer. He indicated the retainer had a diameter of 10 inches and was one of the biggest retainers ever installed. Also, he recommended the retainer be set at a depth from 385 feet to 390.5 feet. The element inside the retained is then expanded with the use of pressurized water, and it expands to the sidewalls of the borehole to cut off water flow from beneath it. During installation, however, water beneath the retained is directed through it and up the drill pipe.

The retainer was set at a depth of 385 feet. A pressure of 343 psi (corrected) was recorded at this depth. Bottom hole pressure from the lower zone pushed the retainer up the open borehole 18 feet to a depth of 367 feet. Driller was able to close the valves in the packer with a 10,000-pound pull, and the flow up the drill pipe was stopped. Unfortunately, the retainer again moved up the hole just a few inches, which reopened the valves in it. Therefore, water from the lower zone again began to come out the drill pipe.

The two flows were now separated; the lower flow was coming out of the drill pipe while the upper flow was coming out the top of the conductor pipe. We were therefore able to measure the flow rates with a wier; lower zone flow was 91 gpm and upper zone flow was 84 gpm. A sample of the water from the lower zone was also obtained for testing. Analytical tests will likely be conducted on this sample and reported upon completion.

At this point, it appeared the weight of the drill pipe was holding the retainer in place, and it was decided to place cement on top of the retainer from about 367 feet to 280 feet to hold it in place. Contractor then departed site to go to Northwest Pipe in Billings to obtain 2-inch pipe to place them cement.

Also Roger Perkins with Aquoneering stopped by the site. Mr. Perkins has been measuring the water flows out of the Ruckavina Well #2 on the Raglon Ranch about 1 mile away. He indicated the well has lost about 50 gpm since drilling for the Fish Hatchery well started. The high pressure flows and drilling conditions were described to Roger. He indicated these conditions were likely related to the loss of flow from Ruckavina Well #2.

Around 4:00 p.m., the retainer was pulled and the valves shut to prevent the lower zone water from flowing through the drill pipe. The placement of cement on top of the retainer was then

started. It was mixed by the contractor with 3 percent calcium chloride to help set the cement faster. The cement was pumped down on top of the retainer for about one-half hour.

At this point, the upper flow was relatively clear, but then began to gray as it mixed with a little of the pumped cement. This was not considered unusual, because some intermixing was anticipated. After about 45 minutes, however, we noticed the upper flow had turned a very dark gray and was basically cement.

The fact that the cement was flowing back out of the borehole indicated the retainer did not work. It appears the lower flow likely cut channels in the bedrock around the retainer, washing the cement out the top of the borehole. Because the water level in the reserve pit was relatively high, it was decided to utilize the earth raceways of FWP. Assisted Gary Shaver in obtaining the gates for these raceways to help provide some detention of the water from the well.

At around 6:00 p.m., informed Keith Jensen that the retainer did not work. Keith reminded me that there was a meeting tomorrow in Helena at 1:00 p.m. to summarize events related to the construction and installation of the water well. Departed site at about 8:00 p.m.

Gregory T. Staffileno, PE
Montana Manager

gts:khr